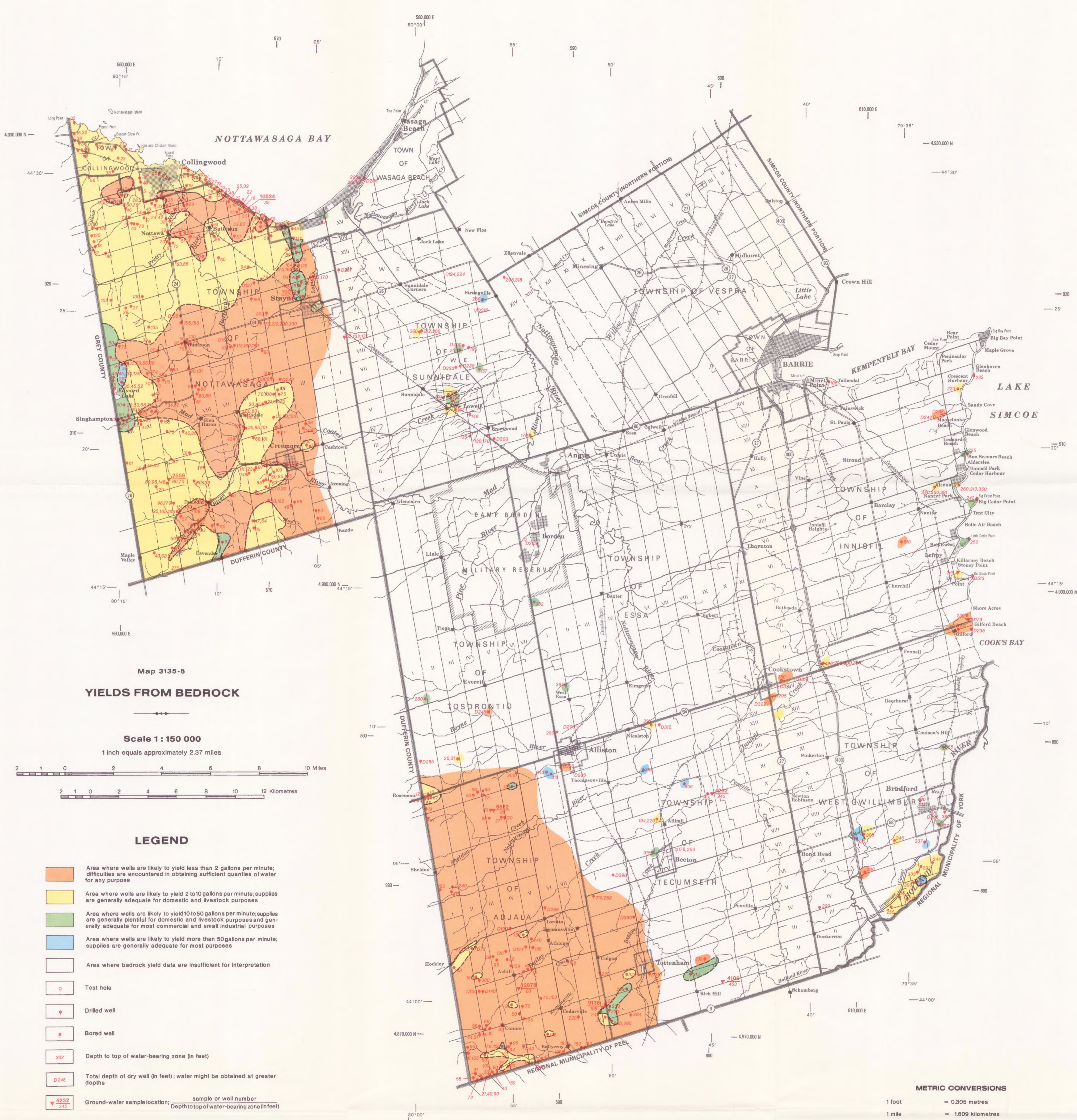


Map 3135-5

YIELDS FROM BEDROCK

Scale 1 : 150 000

1 inch equals approximately 2.37 miles

LEGEND

- Area where wells are likely to yield less than 2 gallons per minute; difficulties are encountered in obtaining sufficient quanties of water for any purpose
- Area where wells are likely to yield 2 to 10 gallons per minute; supplies are generally adequate for domestic and livestock purposes
- Area where wells are likely to yield 10 to 50 gallons per minute; supplies are generally plentiful for domestic and livestock purposes and generally adequate for most commercial and small industrial purposes
- Area where wells are likely to yield more than 50 gallons per minute; supplies are generally adequate for most purposes
- Area where bedrock yield data are insufficient for interpretation
- Test hole
- Drilled well
- Bored well
- 302 Depth to top of water-bearing zone (in feet)
- D246 Total depth of dry well (in feet); water might be obtained at greater depths
- 4232/245 Ground-water sample location; sample or well number / Depth to top of water-bearing zone (in feet)

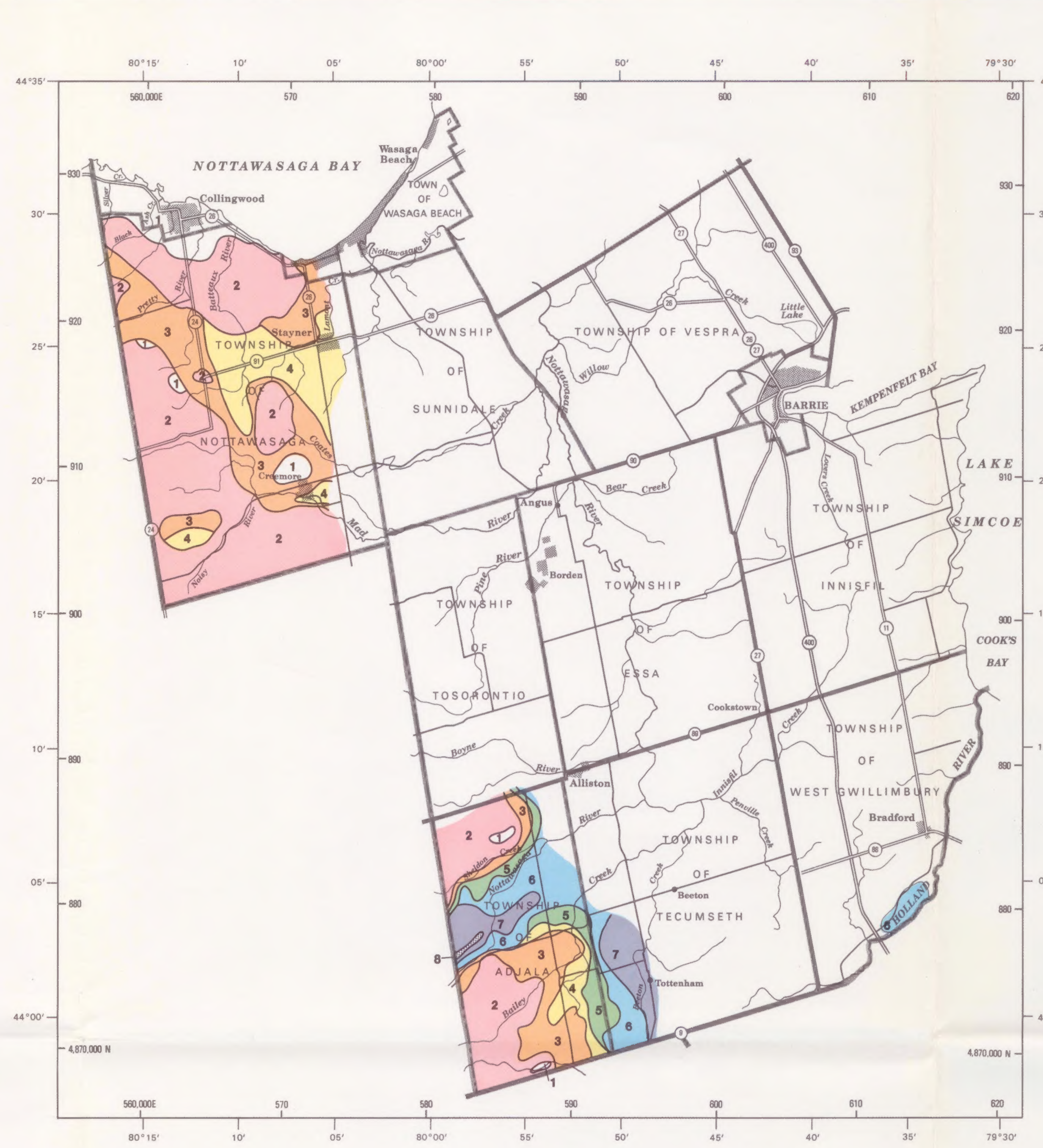
NOTES:

1. Water-sample analyses are shown in Table 3 Sheet 4
2. Individual well yields may differ from yields indicated for an area.
3. Only representative wells have been plotted in areas of high well densities.

METRIC CONVERSIONS

1 foot	= 0.305 metres
1 mile	= 1.609 kilometres
1 gallon	= 4.546 litres
1 gallon per minute	= 7.576×10^{-2} litres per second

MOE 2221



Map 3135-6

DEPTHS TO WATER - BEARING ZONES IN BEDROCK

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

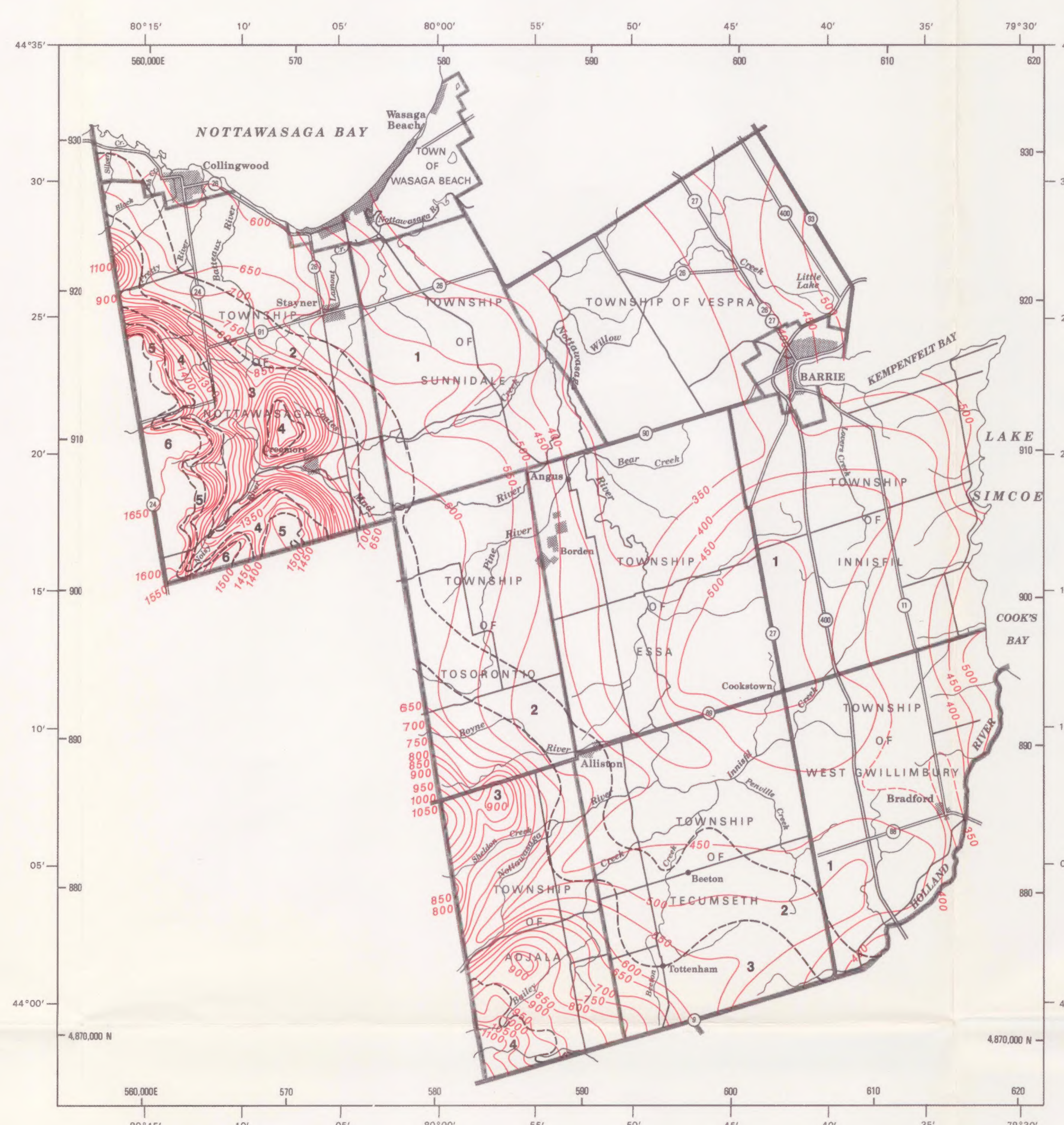
LEGEND

- 1 Area in which most bedrock wells obtain water within 50 feet of ground surface
- 2 Area in which most bedrock wells obtain water between 51 and 100 feet below ground surface
- 3 Area in which most bedrock wells obtain water between 101 and 150 feet below ground surface
- 4 Area in which most bedrock wells obtain water between 151 and 200 feet below ground surface
- 5 Area in which most bedrock wells obtain water between 201 and 250 feet below ground surface
- 6 Area in which most bedrock wells obtain water between 251 and 300 feet below ground surface
- 7 Area in which most bedrock wells obtain water between 301 and 400 feet below ground surface
- 8 Area in which most bedrock wells obtain water between 401 and 500 feet below ground surface
- Area in which depths to water-bearing zones in bedrock data are insufficient for interpretation

NOTE:

Base data for this map are indicated on Map 3135-5.

MOE 2222



Map 3135-7

BEDROCK LITHOLOGY AND TOPOGRAPHY

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

LEGEND

PALEOZOIC

SILURIAN

6	Dolomite, grey	: Amabel Formation
5	Dolomite, brown, grey	: Fossil Hill Formation
		CATARACT GROUP
	Shale, red, green, grey	: Cabot Head Formation
	Dolomite, grey	: Manitoulin Formation
	Sandstone, light grey	: Whirlpool Formation

ORDOVICIAN

4	Shale, soft, red	: Queenston Formation
3	Shale, limestone, dolomite interbedded	: Georgian Bay Formation
2	Shale, grey, blue, brown, black	: Whitby Formation
1		SIMCOE GROUP
	Limestone, grey, argillaceous	: Lindsay Formation
	Limestone, shale, interbedded	: Verulam Formation
	Limestone, brown, grey	: Bobcaygeon Formation

- Geologic boundary approximate
- 750 Bedrock surface–elevation contour, interval 50 feet (all elevations in feet above mean sea level)

NOTES:

1. Bedrock geology after Liberty (1969)
2. Location of bedrock topography control points are shown on Map 3135–5

MOE 2223

DESCRIPTIVE NOTES

In this publication, ground-water availability on a regional scale is indicated in terms of probable quantities of water available, depths at which water is commonly found, and water quality at sampled locations. Because of the complexity of ground-water occurrence, the foregoing information is presented on four map sheets:

Sheet 1: Supplies in Shallow Overburden
Sheet 2: Supplies in Deep Overburden
Sheet 3: Supplies in Bedrock
Sheet 4: Water Quality

Hydrogeologic interpretations are based on data obtained from approximately 8,000 water-well records on file with the Ontario Ministry of the Environment and from past documented studies of ground-water availability. The appropriate references are listed on each map sheet. Reliability of the interpretations varies throughout the region and a periodic up-dating or revision of the present interpretations may be necessary as new hydrogeologic information becomes available.

It is important to note that the interpreted probable well yields may not everywhere represent yields available to all wells because of variations in local hydrogeology, type of well construction, and in the reliability of available data. However, the indicated yields are thought to be good approximations in most areas. In cases where reliable, long-term yields are sought, it is necessary to undertake detailed hydrogeologic investigations and pumping tests.

ASSESSING WATER REQUIREMENTS

In order to evaluate well yields, the amount of water required from a prospective well should first be estimated. To estimate the approximate domestic and livestock daily water requirements, multiply the number of users (people and animals) by the appropriate figure in the table below. If desired, an additional 20 to 30% can be added to the total to account for increased demand in the future. While individual residential needs are difficult to estimate, most homes with water-consuming items such as washing machines will average about 100 gallons per day per person.

It is important to take into account the water demand during peak periods of usage in order that the well does not run dry temporarily. This demand can be estimated by counting the number of fixtures and water outlets in the house which will be used at one time, and multiplying by the flow rate for each. Tables showing the flow rate per fixture can be obtained from water-supply equipment dealers.

Approximate Daily Water Requirements

each member of the family (kitchen, laundry, bath)	50-150 gallons per day
for each producing milk cow (incl. washing)	35 gallons per day
for each dry cow	15 gallons per day
for each steer, horse	12 gallons per day
for each hog	4 gallons per day
for each sheep	2 gallons per day
for each 100 chickens	6 gallons per day
for each 100 turkeys	12 gallons per day

Note:—table modified from F. R. Hore, Farm Water Supply, Ontario Department of Agriculture and Food, Publication 476

For information on irrigation requirements, contact your Regional Office of the Ontario Ministry of Agriculture and Food.

EVALUATION OF PROSPECTIVE WELL SITES

By using the maps in this publication along with the following step-by-step procedure, prospective well sites can be evaluated in terms of probable yields, likely depths to water-bearing zones, and likely quality of water at each site. Subsequently, this information can be used in other considerations such as; possible water treatment, pump type and size, well cost, and type of well construction (a table illustrating the different types of well construction and their applications is appended).

The maps should be used in the suggested sequence in order to obtain the most economic wells. Map 3135-1 indicates yields from the shallowest formations and should be consulted first. Progressively deeper and more costly wells will have to be constructed as water is sought from deeper formations in order to obtain the yields indicated on maps 3135-3 and 3135-5.

Evaluation Procedure

To evaluate yields:

1. locate the well site on Map 3135-1 of Sheet 1 (Yields from Shallow Overburden);
2. note the colour of the map at the well site;
3. refer to the legend and relate the colour to the appropriate probable yield;
4. if the probable yield does not meet your water requirements, repeat steps one through three using Map 3135-3 on Sheet 2 (Yields from Deep Overburden). Similarily, if probable yields determined from Map 3135-3 are insufficient, repeat the same steps using Map 3135-5 on Sheet 3 (Yields from Bedrock).

To evaluate the depths to water-bearing zones:

5. If Map 3135-1 was selected in the above steps, water-bearing zones occur at depths easily reached by shallow dug and bored wells and sand points; if Map 3135-3 was selected, locate the well site on Map 3135-4 and note the depth to the water-bearing zones by using the legend; if Map 3135-5 was selected, locate the well site on Map 3135-6 and note the depths to the water-bearing zones by using the legend;
6. exact depths to water-bearing zones for individual wells are shown on maps 3135-1, 3135-3 and 3135-5.

To evaluate water quality:

7. to evaluate the likely ground-water quality at a potential well site, locate the well on the selected yield map and note the nearby ground-water sampling points. Chemical analyses of these samples are found in the Inorganic Chemical Analyses tables 1, 2, and 3 on Sheet 4. To interpret the significance of the analyses, refer to Table 4 on Sheet 4.

A COMPARISON OF DIFFERENT WELL TYPES AND THEIR APPLICATIONS

WELL TYPE	SUITABLE GEOLOGIC MATERIALS	ADVANTAGES	DISADVANTAGES
DUG WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Does not require special machinery to construct • Large diameter provides reservoir storage; augments low yields • Can be constructed in areas of limited access	• Labour intensive to construct • Depth is limited because of caving • Well failure is common during dry periods because of usually shallow depths
BORED WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Efficient method of constructing large-diameter wells • Large diameter provides reservoir storage; augments low yields	• Depth is usually limited because of well-drilling equipment limitations and very hard earth materials
DRILLED WELLS	OVERBURDEN AND BEDROCK moderate to high-yielding materials (sand, gravel, sandstone, limestone)	• Can reach deeper depths than other techniques • Can penetrate bedrock	• Generally small-diameter wells with little reservoir storage capacity
DRIVEN OR JETTED WELLS (Sand Points)	OVERBURDEN moderate to high-yielding materials (sand and gravel)	• Simple installation: can be done by hand or machine • A number of these wells can be hooked into one water-supply system	• Small diameter provides little reservoir storage • Depth is limited; depends on tightness of overburden

YIELDS FROM BEDROCK – SUMMARY

Yields of over 50 gallons per minute to wells in bedrock occur in a few isolated wells penetrating fractured limestone or dolomite at Alliston, east of Bond Head and south of Bradford in the southern part of the map area and north of Singhampton in the northwestern part of the map area. Less fractured limestone and dolomite yield between 10 and 50 gallons per minute at Stayner and Singhampton in the north, as do some highly fractured shales near Tottenham in the southern part of the map area. Yields between 2 and 10 gallons per minute are found in areas of limestone, dolomite and sandstone of the Simcoe Group and the Amabel, Fossil Hill, Manitoulin and Whirlpool formations. Yields of less than 2 gallons per minute are found in most areas underlain by shales of the Cabot Head, Queenston, Georgian Bay and Whitby formations except in the northwestern part of the map area where some of these formations will yield between 2 and 10 gallons per minute.

SOURCES OF INFORMATION

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Bedrock topography interpretation by D. Walmsley and M. E. Turner.

Cartography by H. De Souza.

Base maps derived from 1:50 000 map sheets of the National Topographic series.

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE (Southern Portion)

Map 3135

GROUND-WATER PROBABILITY

SHEET 3

WATER SUPPLIES IN BEDROCK